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Juan C. Meza

Work experience

2002 - Present Lawrence Berkeley National LaboratoryBerkeley, CA

Department Head and Senior Scientist, High Performance Computing Research

- Provide leadership for the department in mathematical modeling, algorithmic design, software implementation, system architecture, and future technologies.
- Lead PI for project developing scalable methods for studying the electronic excitation and optical responses of nanostructures.
- Research in parallel methods for simulation-based optimization problems.

2001 - 2002 Sandia National Laboratories Livermore, CA

Distinguished Member Technical Staff

- Project lead for the MICS Large Scale Scientific and Engineering Design Optimization project.
- Project lead for Computational Sciences Research Foundation project on Uncertainty Quantification.
- Program manager for PSE Advanced Simulation Development Environment
- Research in parallel methods for simulation-based optimization problems and methods for quantification of uncertainty.

2000 - 2001 Sandia National Laboratories Washington, D.C.

Senior Technical Advisor, DOE Office of Advanced Simulation and Computing

- One year temporary assignment to the Department of Energy to provide technical expertise to assist the Accelerated Strategic Computing Initiative (ASCI) program concerning high performance computing and applications related services.
- Assist in planning and coordinating the development of engineering codes by Sandia National Laboratories and performance and safety codes by the Los Alamos National Laboratory and the Lawrence Livermore National Laboratory.
- Provide assistance to the Office of Advanced Simulation and Computing in guiding the development of improved numerical

algorithms for incorporation in engineering, performance and safety codes.
- Review the ASCI Implementation Plans developed by the national laboratories and assist in monitoring the progress of the laboratories in carrying out these plans.

1998 - 2000 Sandia National Laboratories Livermore, CA

Manager, Computational Sciences and Mathematics Research

- ASCI Problem Solving Environment / Advanced Software Development Environment Program Manager
- Member of Sandia/California site Research Council
- Research Foundation Network Research Program Manager

1997 - 1998 Sandia National Laboratories Livermore, CA

Manager, Distributed Computing

- ASCI Problem Solving Environment / Application Development Support Program Manager
- Development of Distance / Distributed Computing program plan
- Development of Verification and Validation program plan
- Technical Liaison to DOE Strategic Alliances program for Stanford Center for Integrated Turbulence Simulations

1995 - 1997 Sandia National Laboratories Livermore, CA

Distinguished Member of the Technical Staff

- ASCI Problem Solving Environment / Application Development Support Project Lead
- DOE 2000 Advanced Computational Toolkit Project Lead
- Principal Investigator for Mathematical, Information and Computational Sciences project on Large-Scale Optimization for Scientific and Engineering Design Optimization

1987 - 1995 Sandia National Laboratories Livermore, CA

Senior Member of the Technical Staff

- Principal Investigator for Parallel Optimization Laboratory Directed Research and Development project
- Program Manager for Technology Transfer Initiative project on 3D Geophysical Inverse Modeling
- Development of semiconductor device simulation code for the modeling of single-event upset phenomenon

1986 - 1987 Rice University Houston, TX

Lecturer and Research Associate

1980 - 1986 Exxon Production Research Houston, TX
Research Engineer

1979 - 1980 Amdahl Corporation Sunnyvale, CA
System Design Engineer

Education

1981 - 1986 Rice University Houston, TX
Ph. D. Mathematical Sciences
MA Mathematical Sciences
Thesis Adviser: William W. Symes
Thesis: *Conjugate Residual Methods for Almost Symmetric Linear Systems*

1978 - 1979 Rice University Houston, TX
MS Electrical Engineering

1974 - 1978 Rice University Houston, TX
BS Electrical Engineering (cum laude)

Professional memberships

American Association for the Advancement of Science
Association for Computing Machinery
Mathematical Programming Society
Society for Industrial and Applied Mathematics
Society for Advancement of Chicanos and Native Americans in Science

Awards received

- Sandia National Laboratories Hispanic Leadership Committee Award, May 23, 2002
- Sandia National Laboratories Royalty Award, 1996, 1997, 1998
- Sandia Employee Recognition Award, 1995
- Sandia Award for Excellence, 1993
- IBM Fellowship 1982-1983
- Tau Beta Pi Engineering Honor Society
- National Merit Scholarship 1974-1978

Publications

- A Constrained Optimization Algorithm for Total Energy Minimization in Electronic Structure Calculation, C. Yang, J. Meza, L. Wang, Technical Report LBNL-57434 (2006) to be published in Journal of Computational Physics.
- Motif-based Hessian matrix for *ab initio* geometry optimization of nanostructures, Z. Zhao, L.-W. Wang, J. Meza, Technical Report LBNL-59974 (2006), to be published in Physical Review B.
- Using Pattern Search Methods for Surface Structure Determination of Nanostructures, Z. Zhao, J. Meza, M. van Hove, Technical Report LBNL-57541 (2005).
- Identification of Severe Multiple Contingencies in Electric Power Networks, V. Donde, V. Lopez, B. Lesieutre, A. Pinar, C. Yang, J. Meza, LBNL-57994, Proceedings 37th North American Power Symposium (2005).
- NERSC "Visualization Greenbook" Future Visualization Needs of the DOE Computational Science Community Hosted at NERSC, B. Hamann, E. Wes Bethel, Horst Simon, Juan Meza, Technical Report LBNL-51699 (2002)
- Creating Science-Driven Computer Architecture: A New Path to Scientific Leadership, C. William McCurdy, Rick Stevens, Horst Simon, William Kramer, David Bailey, William Johnston, Charlie Catlett, Rusty Lusk, Thomas Morgan, Juan Meza, Michael Banda, James Leighton, and John Hules, Technical Report LBNL/PUB-5483, (2002).
- A Class of Trust Region Methods for Parallel Optimization, P.D. Hough, J. C. Meza, SIAM Journal of Optimization, Vol. 13, No. 1, pp 264-282, 2002. Also available as Technical Report SAND98-8245 (1998).
- Can Data Recognize Its Parent Distribution? A.W. Marshall, J. Meza, I. Olkin, Journal of Computational and Graphical Statistics, Vol. 10, No. 3 (2001). Also available as Technical Report SAND99-8241, May 1999.
- Simulation of Equipment Design Optimization in Microelectronics Manufacturing, J.C. Meza, C.H. Tong, C.D. Moen, Proceedings of the 30th Annual Simulation Symposium, Atlanta, Georgia, April 7-9, 1997.
- Novel Applications of Optimization to Molecule Design, T.D. Plantenga, R.S. Judson, J.C. Meza, IMA Series "Large Scale Optimization with Applications, Part III", Ed. L. Biegler, T. Coleman, A. Conn, and F. Santosa, Vol. 94, 1997, Springer.

- Parallel Optimization Methods for Agile Manufacturing. Technical Report SAND97-8275, August 1997 (joint with C.D. Moen, T.D. Plantenga, P.A. Spence, C.H. Tong, B.A. Hendrickson, R.W. Leland, G.M. Reese).
- Automatic Differentiation for Gradient-Based Optimization of Radiatively Heated Microelectronics Manufacturing Equipment. Proceedings of 6th AIAA/NASA/ISSMO Symposium on Multidisciplinary Analysis and Optimization, Sept. 4-6, 1996, Bellevue, WA (joint with C.D. Moen, P.A. Spence, T.D. Plantenga).
- A Multigrid Preconditioner for the Semiconductor Equations. SIAM J. Sci. Comput., Vol. 17, No.1, 118-132, 1996 (joint with R.S. Tuminaro).
- Asynchronous Global Optimization Techniques for Medium and Large Inversion Problems. Technical Report SAND95-8591, Sandia National Laboratories, 1995 (joint with V. Pereyra and M. Koshy).
- A Comparison of a Direct Search Method and a Genetic Algorithm for Conformational Searching. J. Comp. Chem., Vol. 17, No. 9, 1142-1151, 1996 (joint with R.S. Judson, T.R. Faulkner and A.M. Treasurywala).
- Optimal Control of a CVD Reactor for Prescribed Temperature Behavior. Technical Report SAND95-8224, Sandia National Laboratories, 1995 (joint with T.D. Plantenga).
- Optimal Heat Transfer Design of Chemical Vapor Deposition Reactors. Technical Report SAND95-8223, Sandia National Laboratories, 1995 (joint with C.D. Moen and P.A. Spence).
- A Modification to the GMRES Method for Ill-Conditioned Linear Systems. Technical Report SAND95-8220, Sandia National Laboratories, 1995.
- Direct Search Methods for the Molecular Conformation Problem. J.Comp. Chem., Vol. 15, 627-632, 1994 (joint with M.L. Martinez).
- OPT++: An Object-Oriented Class Library for Nonlinear Optimization. Technical Report SAND94-8225, Sandia National Laboratories, 1994.
- Numerical Procedures for Estimating the Parameters in a Multivariate Homogeneous Correlation Model with Unequal Variances. Sankhya, Vol. 55, Part 3, 506-515, 1993 (joint with I. Olkin).
- A Parallel Network Computer Approach for 3D Geophysical Modeling. Technical Report SAND92-8467, Sandia National Laboratories, 1992 (joint with M. Koshy, V. Pereyra).

- Conjugate Residual Methods for Almost Symmetric Linear Systems. Journal of Optimization Theory and its Applications, Vol. 72, No. 3, pp. 415-440, 1992 (joint with W.W. Symes).
- Deflated Krylov subspace methods for nearly singular linear systems. Journal of Optimization Theory and its Applications, Vol. 72, No. 3, pp. 441-457, 1992 (joint with W.W. Symes).
- Do Intelligent Configuration Search Techniques Outperform Random Search for Large Molecules? International Journal of Quantum Chemistry Vol. 44, 277-290, 1992 (joint with R.S. Judson, M.E. Colvin, A. Huffer, and D. Gutierrez).
- Distributed Computing Applications in Forward and Inverse Geophysical Modeling. Presented at the Society of Exploration Geophysicists' 1991 Annual Meeting, November 10-14, Houston, Texas (joint with M. Koshy and V. Pereyra).
- DANCIR: A Three-Dimensional Steady-State Semiconductor Device Simulator. Technical Report SAND89-8266, Sandia National Laboratories, 1990 (joint with J.F. Grcar).
- Towards the development of engineering production codes for the Connection Machine. Proceedings of the Fourth Conference on Hypercubes, Concurrent Computers and Applications, March 6-8, 1989, Monterey, California (joint with R.E. Cline Jr., B.M. Boghosian, and B. Walker).
- Domain decomposition algorithms for linear hyperbolic equations. Technical Report 87-20, Rice University, 1987 (joint with W.W. Symes).
- An Effective Methodology for PDE Software Development. In PDE Software: Modules, Interface and Systems, edited by B. Engquist and T. Smedsaas, Elsevier Science Publishing, New York, 1984 (joint with L.K. Chen, T.K. Eccles, G.O. Morrell, A.H. Sherman, W.J. Silliman).

Invited Presentations

- Some New Approaches for Solving Simulation-Based Optimization Problems, San Diego State University, Dec. 14, 2001.
- Parallel Optimization Methods for Simulation-Based Optimization, Richard Tapia Celebration of Diversity in Computing Symposium, Oct. 19, 2001, Houston TX.
- Using Design of Computer Experiments to Quantify Uncertainty in Simulations, Sensitivity Analysis Workshop, August 17, 2001, Livermore, CA.

- The Role of Computational Mathematics in Industrial Problems, IMA Career Workshop in Computational Science and Engineering, May 4-6, 2001, Minneapolis, MN.
- Optimization Challenges and Opportunities in the ASCI Program, Workshop on PDE-constrained Optimization, April 4-6, 2001, Santa Fe, NM.
- Optimization Methods for Simulation-Based Problems, George Mason University, Nov. 17, 2000, Washington DC.
- A Class of Trust-Region Methods for Simulation-Based Optimization, Old Dominion University, Oct. 20, 2000, Norfolk, VA. I gave a very similar talk at Cornell University on March 31, 2000.
- I want to be a Computational Mathematician, Second Minorities and Applied Mathematicians Conference - Connections to Industry and Laboratories, Sept. 17-19, 1998, Berkeley, CA.
- Optimal Design and Control of Chemical Vapor Deposition Reactors. IMA Workshop, "Minorities and Applied Mathematics: Connections to Industry", October 4-6, 1996.
- In Search of Optimal Designs, University of California, Davis, Minority Undergraduate Research and Participation in the Physical and Mathematical Sciences, Davis, California, March 15, 1995.
- The Role of Mathematics in Computational Science and Engineering, University of California, Irvine, CAMP Seminar Series, Irvine, California, March 8, 1993.
- Massively Parallel Methods for Nonlinear Equations and Optimization, DOE/Office of Scientific Computing Workshop, Albuquerque, New Mexico, February 2-5, 1993.
- Massively Parallel Scientific Computation, Society for the Advancement of Chicanos and Native Americans in the Sciences, San Antonio, Texas, January 2-6, 1992.
- Three Dimensional Semiconductor Device Modeling, Conference on Numerical Optimization Methods In Differential Equations and Control, Raleigh, North Carolina, July 15-17, 1991.
- Semiconductor Device Modeling, Miniconference on Newton-Like Methods for Large-Scale Nonlinear Systems, Logan, Utah, August 27-29, 1989.
- Three-Dimensional Time-Dependent Semiconductor Device Modeling, Proceedings of the Fifth International Workshop on Physics of Semiconductor Devices, New Delhi, India, December 11-15, 1989.

Committees

- Member, Board of Trustees, SIAM, 2006 –
- Member, Committee on Opportunities in Science, AAAS, 2006 –
- Member, Center for Pure and Applied Mathematics, UC Berkeley, 2003-2006.
- Member, Department of Energy Advanced Scientific Computing Advisory Committee, April 2000 – April 2003. Also served as the chair for the ASCAC Subcommittee on Biotechnology.
- Member, MSRI Human Resources Advisory Committee, 2001-2005.
- Member, SIAM Committee on Annual Meeting (2001-present).
- Member, SIAM Master Program Committee (2001-present).
- Co-Chair, SIAM Graduate Student Focus on Diversity Day Workshop, 2001, 2002.
- Co-Chair, SIAM 10th Conference on Parallel Processing for Scientific Computing, 2001.
- Member, Organizing Committee for SIAM Annual Meeting 2000.
- Member, Board of Governors, Institute for Mathematics and its Applications, January 1999 - December 2001.
- Member, National Partnership for Advanced Computational Infrastructure External Visiting Committee, January 1999 - Present.
- Member, External Advisory Committee for the Center for Research on Parallel Computation, July 1, 1996-June 30, 1998.
- Editor, Society for Industrial and Applied Mathematics Special Interest Group in Optimization Views and News Newsletter, 1996-2001.
- Member, Parallel Tools Consortium Steering Committee, 1995-1997.
- Member, Advisory Board Science in California Communities Informal Science Education, 1995-1997.
- Editor, Society for Industrial and Applied Mathematics Special Interest Group in Linear Algebra Electronic Newsletter, 1995-1997.
- Member, AMS-SIAM Committee on Applied Mathematics, American Mathematical Society and Society for Industrial and Applied Mathematics. 1994-1995.
- Member, Board of Trustees, Institute for Mathematical Sciences Education.
- Member, California Coalition for Mathematics Committee, 1991-1992.

- Member, Committee on Advising, Mathematical Association of America.
- Member, Committee on Materials on Careers, Mathematical Association of America.